

What is claimed is:

1. An electrosurgical system comprising a radio frequency generator, an electrosurgical instrument, and a fluid enclosure, the generator having a radio frequency output for delivery of power to the electrosurgical instrument when immersed in an electrically-conductive fluid, the electrosurgical instrument having an electrode assembly at the distal end thereof, the electrode assembly comprising a tissue treatment electrode, and a return electrode axially spaced therefrom in such a manner as to define, in use, a conductive fluid path that completes an electrical circuit between the tissue treatment electrode and the return electrode, wherein the fluid enclosure is adapted to surround an operation site on the skin of a patient or an incision leading to a cavity surgically created within the patient's body, wherein the fluid enclosure includes sealing means for sealing against the patient's tissue, and wherein the fluid enclosure includes at least one port through which the electrosurgical instrument is insertable, and through which the electrically-conductive fluid can enter and/or leave the enclosure.
2. An electrosurgical system as claimed in claim 1, wherein the fluid enclosure is provided with an inlet through which the electrosurgical instrument can be inserted.
3. An electro surgical instrument as claimed in claim 1, wherein the fluid enclosure is provided with port means for supplying electrically-conductive fluid to, and removing said fluid from, the fluid enclosure.
4. A system as claimed in claim 3, wherein the fluid enclosure is provided with a fluid inflow tube and a fluid outflow tube, each of which is associated with a respective port in the fluid enclosure.
5. A system as claimed in claim 4, wherein the fluid inflow tube is provided with a plurality of apertures at the distal end portion thereof.

6. A system as claimed in claim 2, wherein the inlet is adapted to receive an endoscope, the electrosurgical instrument being insertable, in use, through the endoscope.

7. A system as claimed in claim 6, wherein the fluid enclosure is provided with a port through which electrically-conductive fluid can be removed from the enclosure, a working channel within the endoscope constituting a channel for delivering electrically-conductive fluid to the interior of the fluid enclosure.

8. A system as claimed in claim 2, wherein the fluid enclosure is provided with a window, through which a surgeon can visualise the region surrounding the tissue treatment electrode.

9. A system as claimed in claim 8, wherein the window is a magnifying window.

10. A system as claimed in claim 1, wherein the electrosurgical instrument is a monopolar instrument having a single, tissue treatment electrode at the distal end thereof, and a metal collar positioned, in use, adjacent to the tissue treatment electrode constitutes the return electrode, the metal collar and the tissue treatment electrode being connected to the generator.

11. A system as claimed in claim 1, wherein the fluid enclosure is such that it covers an area of skin surrounding the operation site or incision that is substantially larger than the area of the operation site or incision, whereby the volume of electrically-conductive fluid contained in the fluid enclosure is sufficiently large to ensure that its heat capacity is effective to remove heat away from tissue-being treated.

12. A system as claimed in claim 1, wherein the sealing means is constituted by an outwardly-extending flange provided on the fluid enclosure.

13. A system as claimed in claim 12, wherein the flange is integrally formed with the fluid enclosure.

14. A fluid enclosure device for use in electrosurgical procedures, the device comprising a translucent flexible web member having a sealing flange at its periphery for forming a substantially fluid-tight seal with a patient's skin thereby to enable tissue to be treated within a substantially fluid-tight enclosure provided by the patient's skin and the flexible web member, and at least a first aperture in the web member to enable introduction of an electrosurgical instrument into the enclosure while maintaining integrity of the substantially fluid-tight seal.

15. A fluid enclosure device according to claim 14, further comprising a second aperture to enable supply of electrically-conductive fluid within the enclosure.

16. A fluid enclosure device according to claim 15, further comprising a third aperture to enable removal of waste matter from within the enclosure.

17. A fluid enclosure device according to claim 16, further comprising a fluid outflow tube extending from the third aperture into the enclosure, the outflow tube being buoyant in electrically-conductive liquid.

18. A method of treating tissue using an electrosurgical system comprising an electrosurgical generator adapted to generate a radio frequency oscillating voltage output across first and second output terminals; an electrosurgical instrument having an active tissue treatment electrode connected to the first generator output terminal; fluid delivery means for delivering electrically-conductive fluid to the tissue to be treated; and a return electrode connected to the second generator output terminal, the method comprising the steps of:

enclosing, in a substantially fluid-tight manner, a space within which the tissue to be treated is located, and within which at least the active electrode is located;

operating the fluid delivery means at least partly to fill the space with electrically-conductive fluid;

operating the generator to apply a radio frequency voltage between the active and return electrodes, and completing at least a part of a conduction path between the active and

return electrodes using the electrically-conductive fluid; and

manipulating the active electrode in the vicinity of the tissue to be treated.

19. A method according to claim 18, further comprising the step of positioning the return electrode within the space.

20. A method according to claim 18 or claim 19, wherein the electrosurgical instrument comprises a shaft, and the active and return electrodes are located on a distal end of the shaft, the method further comprising the steps of positioning the proximal end of the shaft to extend out of the space, and manipulating the active electrode by moving the proximal end of the shaft.

21. A method according to any one of claims 18 to 20, wherein the electrically-conductive fluid is supplied to the space continually, and the method further comprises the step of removing waste matter from within the space.

22. A method according to any one of claims 18 to 21, wherein the space is enclosed by means of a flexible enclosing member which forms a seal with a patient's skin, and the method further comprises the step of reducing the pressure within the space to a level below air pressure in the immediate vicinity outside the space.

23. A method according to any one of claims 18 to 21, wherein the space is enclosed by means of a flexible enclosing member which forms a seal with a patient's skin, and the method further comprises the step of adhesively fixing the flexible member to the patient's skin.

24. A method according to any one of claims 18 to 23, wherein the enclosing step is such that the space encloses a region of the epidermis.

25. A method according to claim 24, wherein the active electrode is manipulated to achieve at least one of the following: treatment of skin lesions; removal of tumours;

dermabrasion: reduction of wrinkles; removal of wrinkles; treatment of solar keratosis; treatment of basal cell carcinoma.

26. A method according to claim 18, wherein the enclosing step is such that the space encloses a cavity within which the tissue to be treated is situated.

27. A method according to claim 26, wherein the cavity is a natural body cavity.

28. A method according to claim 26, wherein the active electrode is manipulated to achieve at least one of the following: thermal modification of collagen fibres; treatment of parenchymal and mesenchymal tumours.

29. A method according to claim 28, wherein the thermal modification of collagen fibres is performed to correct bladder neck descent.

30. A method according to claim 28, wherein the thermal modification of collagen fibres is performed to treat ligaments or tendons.

31. A method of treating a tumour in a colon using an electrosurgical system comprising:
an electrosurgical generator adapted to generate a radio frequency oscillating voltage output across first and second output terminals;

an electrosurgical instrument having an active tissue treatment electrode connected to the first generator output terminal;

fluid delivery means for delivering electrically-conductive fluid to the tumour to be treated; and

a return electrode connected to the second generator output terminal,

the method comprising the steps of:

enclosing, in a substantially fluid-tight manner, a space in the colon within which the tumour to be treated is located, and within which at least the active electrode is located;

operating the fluid delivery means at least partly to fill the space with electrically-conductive fluid;

operating the generator to apply a radio frequency voltage between the active and return electrodes, and completing at least a part of a conduction path between the active and return electrodes using the electrically-conductive fluid; and

manipulating the active electrode in the vicinity of the tumour to be treated.

32. A method according to claim 31, wherein the active electrode is manipulated to vaporise the tumour.

33. A method according to claim 31, further comprising the step of positioning the return electrode within the space.

34. A method according to claim 31, wherein the electrosurgical instrument comprises a shaft, and the active and return electrodes are located on a distal end of the shaft, the method further comprising the steps of positioning the proximal end of the shaft to extend out of the space, and manipulating the active electrode by moving the proximal end of the shaft.

35. A method according to claim 31, wherein the electrically-conductive fluid is supplied to the space continually, and the method further comprises the step of removing waste matter from within the space.

36. A method according to claim 31, wherein the electrically-conductive fluid is a gas.

37. A method according to claim 31, wherein the space is enclosed by means of a flexible enclosing member which forms a seal with a portion of the colon.

38. A method according to claim 37, wherein the method further comprises the step of reducing the pressure within the space to a level below air pressure in the immediate vicinity outside the space.

*(the space would collapse)
(→ pressure)*

39. A method according to claim 37, wherein the flexible enclosing member includes a proximal bung and a distal bung.

40. A method according to claim 39, including the further step of inflating the colon by delivering conductive fluid to the space through a first opening in the distal bung so that the tumour can be treated by the active electrode.

41. A method according to claim 40, including the further step of inserting into the space through the first opening an endoscope having a first channel for delivering the conductive fluid and a second channel for inserting the active electrode.

42. A method according to claim 40, including the further step of removing the conductive fluid from the space through a second opening in the proximal bung.

43. A method according to claim 37, wherein the flexible enclosing member is inserted endoscopically into the space through the colon's lumen.

44. A method according to claim 37, including the further step of laparoscopically inserting a flexible sleeve to thereby surround a region of the colon containing the tumour to be treated and apply a second pressure against a first pressure resulting from the filling of the space with the electrically-conductive fluid.

45. A method according to claim 44, wherein the flexible enclosing member includes a proximal bung and a distal bung and wherein the proximal and distal bungs form a pressure seal against both the colon and the pressure applied via the inflatable sleeve.

46. A method according to claim 44, wherein the active electrode is manipulated to remove the tumour and a region of the colon within which the tumour is located once the blood supply and lymphatics of the region have been disconnected.

47. A method according to claim 40, including the further step of inserting into the space through the first opening an endoscope having a fluid channel for delivering the conductive fluid and an instrument channel for inserting the active electrode.